

### Claims

1. A fibre for thermal bonding comprising a propylene polymer composition having an MFR value from 4 to 50 g/10 min, and being selected from:
  - i) a crystalline propylene random copolymer or a crystalline propylene polymer composition selected from:
    - a) a copolymer or polymer composition containing at least 0.8% by weight of ethylene and optionally one or more C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefins and having a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by temperature rising elution fractionation (TREF) with xylene to the xylene soluble fraction, higher than 8; and
    - b) a copolymer or polymer composition containing more than 2.5 wt% by weight of ethylene and optionally one or more C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefins and having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by TREF with xylene to the xylene soluble fraction at room temperature, higher than 4; and
  - ii) a crystalline propylene polymer composition having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight; the said composition containing at least 0.64 wt% of ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin recurring unit and comprising (percent by weight):
    - I) 20-80% of a crystalline propylene homopolymer and/or crystalline propylene random copolymer containing up to 1.5% by weight of ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin; and
    - II) 20-80% of a crystalline random copolymer selected from:
      - IIa) a copolymer of propylene with 0.8 to 10% by weight of ethylene; provided that the difference in the ethylene content between polymer (I) and polymer (IIa) be at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned; and

- I Ib) a copolymer of propylene with 1.5 to 18% by weight of a C<sub>4</sub>-C<sub>10</sub> α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer (I) and polymer (IIb) be at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and
  - I Ic) a mixture of copolymer (IIa) and copolymer (IIb).
2. The fibre of claim 1 wherein polymer composition (ii) has a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95° C by TREF with xylene to the xylene soluble fraction higher than 8; the said composition containing at least 0.64 wt% of ethylene and/or C<sub>4</sub>-C<sub>10</sub> α-olefin recurring unit and comprising (percent by weight):
  - I) 20-80% of a crystalline propylene homopolymer and/or crystalline propylene random copolymer containing up to 1.5% by weight of ethylene and/or C<sub>4</sub>-C<sub>10</sub> α-olefin; and
  - II) 20-80% of a crystalline random copolymer selected from:
    - IIa) a copolymer of propylene with 0.8 to 5% by weight of ethylene; provided that the difference in the ethylene content between polymer (I) and polymer (IIa) be at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned;
    - IIb) a copolymer of propylene with 1.5 to 12% by weight of a C<sub>4</sub>-C<sub>10</sub> α-olefin and optionally ethylene; provided that the difference in the comonomer content between polymer (I) and polymer (IIb) be at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and
    - IIc) a mixture of copolymer (IIa) and copolymer (IIb).
3. The fibre of claims 1 and 2 wherein the polymer material has MFR values from 6 to 15 g/10 min.
4. The fibre of claims 1 to 3 wherein the difference in the ethylene content between polymer (I) and polymer (IIa) is at least 1 percentage unit with respect to the weight of the (co)polymer concerned.
5. The fibre of claims 1-4 having a value of bonding force at 150° C of at least 300 cN.

6. The fibre of claims 5 and 6 obtainable by a spinning process wherein the composition is subjected to an extrusion temperature of 275° C or less.
7. The fibre of claim 5 having a bonding force value of 300 to 800 cN and an MFR value of 50 g/10 min or less and obtainable by a spinning process wherein the composition is subjected to an extrusion temperature of 275° C or less.
8. The fibre of claims 6-7 wherein the extrusion temperature ranges from 260° to 275° C.
9. A melt spin process for the production of the fibres according to claims 1-4 characterised in that it is subjected to the process a propylene polymer composition having an value from 4 to 50 g/10 min and being selected from:
  - i) a crystalline propylene random copolymer or a crystalline propylene polymer composition selected from:
    - a) a copolymer or polymer composition containing at least 0.8% by weight of ethylene and optionally one or more C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefins and having a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95° C by TREF with xylene to the xylene soluble fraction, higher than 8; and
    - b) a copolymer or polymer composition containing more than 2.5 wt% by weight of ethylene and optionally one or more C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefins and having a melting temperature of 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 10% by weight and a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95°C by TREF with xylene to the xylene soluble fraction at room temperature, higher than 4; and
  - ii) a crystalline propylene polymer composition having a melting temperature of at least 153° C or higher, a content of fraction soluble in xylene at room temperature lower than 9% by weight; the said composition containing at least 0.64 wt% of ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin recurring unit and comprising (percent by weight):
    - I) 20-80% of a crystalline propylene homopolymer and/or crystalline propylene random copolymer containing up to 1.5% by weight of ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin; and:

- II) 20-80%, preferably from 30-70%, of a crystalline random copolymer selected from:
  - IIa) a copolymer of propylene with 0.8 to 10% by weight of ethylene; provided that the difference in the ethylene content between polymer (I) and polymer (IIa) be at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned;
  - IIb) a copolymer of propylene with 1.5 to 18% by weight of a C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin and optionally ethylene; provided that the difference in the comonomer content between polymer (I) and polymer (IIb) be at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and
  - IIc) a mixture of copolymer (IIa) and copolymer (IIb).
- 10. The process of claim 9 wherein polymer composition (ii) has a melting temperature of 155° C or higher, a content of fraction soluble in xylene at room temperature lower than 5% by weight, a value of the ratio of the polymer fraction collected at the temperature range from 25° to 95° C by TREF with xylene to the xylene soluble fraction, higher than 8; the said composition containing at least 0.64 wt% of ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin recurring unit and comprising (percent by weight):
  - I) 20-80% of a crystalline propylene homopolymer and/or crystalline propylene random copolymer containing up to 1.5% by weight of ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin; and
  - II) 20-80% of a crystalline random copolymer selected from:
    - IIa) a copolymer of propylene with 0.8 to 5% by weight of ethylene; provided that the difference in the ethylene content between polymer (I) and polymer (IIa) be at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned;
    - IIb) a copolymer of propylene with 1.5 to 12% by weight of a C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin and optionally ethylene; provided that the difference in the comonomer content between polymer (I) and polymer (IIb) be at least 1.5 percentage units with respect to the weight of the (co)polymer concerned; and
    - IIc) a mixture of copolymer (IIa) and copolymer (IIb).

11. The process of claims 9 and 10 wherein the composition is extruded at a temperature of 275° C or lower.
12. The process of claim 11 wherein the composition is extruded at a temperature ranging from 260° to 275° C.
13. A thermally bonded non-woven fabric comprising the fibres of claims 1-8.
14. A composite non-woven fabric comprising two or more layers wherein at least one layer is made of the thermally bonded non-woven fabric of claim 13.
15. A process for the production of non-woven fabric of claim 13, wherein the fibres of claims 1 to 8 are subjected to thermalbonding.
16. A crystalline propylene polymer composition having an MFR value from 4 to 50 g/10 and an ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin content of at least 0.64 wt% and comprising (percent by weight):
  - I) 20-80% of a crystalline propylene homopolymer or crystalline propylene random copolymer containing up to 1.5% by weight of ethylene and/or C<sub>4</sub>-C<sub>10</sub>  $\alpha$ -olefin; and
  - II) 20-80% of a crystalline random copolymer of propylene with higher than 5 to 9% by weight of ethylene;the said composition having a melting temperature of 153° C or higher and a content of fraction soluble in xylene at room temperature lower than 9% by weight.
17. The composition of claim 16 having MFR values from 6 to 15 g/10 min.
18. A process for the polymerisation the crystalline propylene polymer composition of claims 16 and 17 carried out in at least two separate subsequent stages, wherein in at least two polymerisation stages the relevant monomers are polymerised to form polymer (I) and in the other stage(s) the relevant monomers are polymerised to form polymer (II), operating in each stage, except the first step, in the presence of the polymer formed and the catalyst used in the preceding stage.